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Lost in the Wilderness: Terror Management, Action Orientation, and Nature Evaluation

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The authors propose that wilderness is intrinsically associated with death, and, consequently, terror management concerns may promote more negative evaluations of wilderness. Consistent with this, wilderness inspired more thoughts about death than either cultivated nature or urban environments (Study 1), and death reminders reduced perceived beauty of wilderness (Study 2). The authors further suggest that active self-regulation facilitates suppression of the dark side of wilderness. Consistent with this, action orientation was positively related to perceived beauty of wilderness (Study 3), and after viewing wilderness, action-oriented individuals were more efficient at suppressing the association between wilderness and death than state-oriented individuals (Study 4). Direct death reminders overruled the effects of action orientation on nature evaluation (Study 5), presumably because direct death reminders are difficult to suppress even for action-oriented individuals.

In a world that is increasingly urbanized and dominated by human artifacts, people's contact with nature can no longer be taken for granted. Close encounters with wilderness are still possible in remote locations, where human civilization is barely noticeable. In most modern urban environments, however, people's interactions with wild nature are highly restricted and largely dependent on people's willingness to invest time and resources in visiting the great outdoors. Remarkably, the growing distance between people and nature has gone hand in hand with more positive attitudes toward wilderness (Rudzitis & Johansen, 1991; Thacker, 1983). Even so, ancient fears of nature have not vanished, and they may reemerge when people are exposed to wilderness (Bixler & Floyd, 1997; Öhman & Mineka, 2000). Modern individuals have thus come to feel deeply ambivalent toward wilderness, finding it both beautiful and terrifying, both awesome and awful (Burke, 1757/1999).

Wilderness may be defined as any environment where human influences are not discernible and in which natural processes are left free reign (see Shultis, 1999). For various reasons, it seems important to learn more about people's evaluations of wilderness. Attitudes toward large-scale environmental problems like pollution, urbanization, and deforestation are closely connected with people's evaluations of wilderness (Hartig, Kaiser, & Bowler, 2001; Van den Berg, De Vries, & Vlek, in press). Accordingly, improving our understanding of these evaluations may suggest new ways to combat these pressing issues. People's relations with wilderness are, further, of intrinsic psychological interest. For the greater part of evolutionary history, the human species lived in savage, uncultivated territories (Appleton, 1975; Orians, 1980). It is therefore plausible that the human psychological makeup has evolved, at least in part, to cope with the risks and challenges of wilderness environments. Studying people's reactions to wilderness may thus shed more light on the basic workings of the human mind.

In the present research, we seek to illuminate some of the motivational dynamics that underlie people's evaluations of wilderness. Our central assumption is that wilderness is charged with highly ambivalent meanings. The untamed forces of nature are intrinsically connected with uncontrollability and death. At the same time, wilderness embodies the vital forces of life and offers freedom from cultural constraints. Because life and death, freedom and uncontrollability represent equally valid aspects of wilderness, psychological factors may determine how people evaluate wilderness. Salient terror management concerns may sensitize people to their fears of uncontrolled wilderness. Conversely, active self-regulation may enable people to overcome their deeply rooted fears and enjoy the life-enhancing qualities of wilderness. In the following paragraphs, we consider these ideas in more detail and present five studies that empirically tested our analysis.

The Bright and Dark Sides of Wilderness

Wilderness often elicits very positive reactions in people. People generally find wilderness much more beautiful than cultivated nature (Hartig & Evans, 1993; Van den Berg, 2003). Moreover, exposure to wilderness can promote both physical and psychological well-being (Hartig, Evans, Jamner, Davis, & Gärling, 2003; Van den Berg, Koole, & Van der Wulp, 2003). In view of these observations, environmental scientists have argued that people have a "biophilia" motive, a biologically based affinity for life and life-like processes (Ulrich, 1993; Wilson, 1984). Encounters with

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wilderness may further satisfy important psychological needs. Wilderness provides opportunities for mastery and exploration, because it is not preorganized or constrained by artificial boundaries. Moreover, encounters with wilderness allow people to remove themselves from the obligations and pressures that are associated with the civilized world. Finally, the confrontation with wilderness inspires feelings of awe, and it often leads to thoughts about spiritual meanings and eternal processes (Kaplan & Kaplan, 1989; Williams & Harvey, 2001).

Wilderness also has a dark side. Wilderness is inherently associated with death and uncontrollability (Becker, 1962, 1973; Bixler & Floyd, 1997). The laws of nature dictate that all forms of life are finite, therefore death and decay can be witnessed throughout the natural world. In addition, the forces of nature are by definition uncontrolled and often uncontrollable by humans. To be sure, humanity's control over the natural environment has increased dramatically since the modern age. Still, the forces of nature have never been tamed completely, a point that becomes tragically clear during natural disasters like floods and epidemics. Even during less dramatic events, close encounters with nature may give rise to feelings of apprehension (Van den Berg & Ter Heijne, 2004). For instance, modern urban youth commonly experience fear and discomfort when they are exposed to wilderness settings during mandatory school trips (Bixler & Floyd, 1997). In a related vein, many participants of wilderness programs report that being alone in the wilderness can invoke overwhelming feelings of terror and anxiety (Kaplan & Kaplan, 1989).

In sum, wilderness is charged with highly ambivalent meanings. Life and death, freedom and chaos are equally valid aspects of wilderness. People's responses to wilderness are thus likely to vary depending on which side of nature is psychologically more salient. Koole and Van den Berg (2004) have recently argued that dynamic motivation processes regulate people's responses to wilderness. In line with this argument, we consider how terror management concerns (Solomon, Greenberg, & Pyszczynski, 1991, 2004) and self-regulation (Kuhl, 1984; Kuhl & Koole, 2004) may influence people's sensitivity to the ambivalent meanings of wilderness.

Terror Management and the Dark Side of Wilderness

Given the close association between wilderness and death, people's responses to nature might be influenced by their need to come to grips with deeply rooted existential fears. A systematic framework for understanding how people cope with existential fear is provided by terror management theory (TMT). TMT offers a comprehensive theoretical analysis of the existential concerns that underlie human behavior, an analysis that has been supported by over 100 experiments to date (see Solomon et al., 2004, for a discussion of 20 years of TMT research). Of particular interest, TMT has recently been applied to human–nature relations (Goldenberg, Pyszczynski, Greenberg, & Solomon, 2000; Koole & Van den Berg, 2004).

According to TMT, human–nature relations have been profoundly affected by the development of self-awareness in the human species. Although self-awareness has many adaptive sides, it also leads people to realize that their own death is ultimately inescapable. To manage the potential for terror that comes with this realization, TMT posits that people construct cultural worldviews that offer ways of achieving literal or symbolic immortality. This acculturation process enlarges the separation between humans and nature through a wide variety of cultural practices, such as eating with utensils and avoiding public nudity, and through the creation of cultural artifacts, like automobiles and plastic bags. According to TMT, this cultural separation helps to control existential anxiety. By enlarging the gap between humanity and nature, people implicitly affirm their beliefs that they are symbolic beings, which are not subject to the natural laws of death and decay.[1] In support of TMT, research has shown that individuals who are reminded of death are more likely to distance themselves from their biological functions (Goldenberg & Roberts, 2004) and are more prone to support beliefs that humans are distinct from animals and to report being disgusted by animals (Goldenberg et al., 2001).

From a terror management perspective, nature is especially threatening when the forces of nature do not obey cultural rules and conventions. Terror management concerns thus form a powerful motivation for cultivating wilderness. Consistent with this, virtually all known cultures have presented their members with idealized images of cultivated nature, such as the biblical Garden of Eden and the Arcadian pastoral landscapes of the ancient Greeks (Eisenberg, 1998). Such idealized images convey that the savage forces of nature can be tamed, and they may thereby alleviate the existential anxiety that is aroused by the confrontation with wilderness. Accordingly, existential concerns may give rise not only to decreased preference for wilderness but also to increased preference for cultivated nature. Initial support for this reasoning was found in a study of 460 participants from various regions in the Netherlands (Van den Berg, 1999). In this study, concerns with personal safety were negatively correlated with preference for wild over cultivated natural landscapes. Though preliminary, these findings fit with the notion that existential concerns fuel the desire for human control over natural environments.

Self-Regulation and Suppression of the Dark Side of Wilderness

The need to defend oneself against existential anxiety accounts for a wide range of motivated behaviors (Pyszczynski, Greenberg, & Solomon, 1997). Yet people are not invariably driven by defensive needs. Throughout evolutionary history, people have inhabited environments that were highly dynamic and constantly changing (Sedikides & Skowronski, 1997). To live and prosper in such surroundings, people had to be at least somewhat open to new experiences, to explore new grounds, and to develop new cognitive and behavioral capabilities. If people were always compelled to obey their defensive instincts, they would probably not be prepared to take the risks that are involved in such expansive activities.

[1] Our theoretical perspective distinguishes between fear of nature and fear of chaos or uncertainty. Although nature can be chaotic and disorganizing from the viewpoint of human society, many natural events are simultaneously lawful and terrifying. For instance, the natural decay of the body proceeds in more or less the same orderly and predictable sequence for every human being, but the thought of this physical decay is still anxiety provoking for most people (Goldenberg & Roberts, 2004). Thus, although fear of chaos may sometimes contribute to fear of nature, fear of nature cannot be reduced to fear of chaos or uncertainty.

Self-regulation may be one important mechanism through which people may overcome their initial defensive reactions. Self-regulation refers to central executive functions by which people can override their automatic behavior programs and select more appropriate behaviors (Baumeister, Heatherton, & Tice, 1994). People may use self-regulation to control their negative emotions (Gross, 1999; Koole & Kuhl, in press). Accordingly, self-regulation may enable people to overcome their deeply rooted fears of the wilderness.

An extensive analysis of self-regulation of affective states is provided by personality systems interactions (PSI) theory (Koole & Kuhl, in press; Kuhl, 2000; Kuhl & Koole, 2004). According to PSI theory, self-regulation of affect functions much like a learned skill. Each time that people activate self-regulatory systems when unwanted affect becomes inhibited, their ability to self-regulate affect grows stronger. Over time and depending on individual learning histories, people may develop more or less efficient self-regulation skills. Kuhl (1981) has referred to individuals with well-developed self-regulation skills as "action-oriented" individuals. Individuals with less developed self-regulation skills have been referred to as "state-oriented" individuals.

To date, more than 60 published studies have supported the validity of the action orientation construct (for reviews, see Diefendorf, Hall, Lord, & Strean, 2000; Koole & Kuhl, in press; Kuhl & Koole, 2004). As far as we can tell, no research has directly related action orientation to nature evaluation. Nevertheless, several findings suggest the theoretical relevance of action orientation to human–nature relations. Relative to their state-oriented counterparts, action-oriented individuals are more prone to explore unknown environments (Kuhl, 1984), feel less disoriented in alienating situations (Kuhl & Beckmann, 1994b), are better able to perceive coherence in a threatening context (Baumann & Kuhl, 2002), and are more prone to remove themselves from social obligations (Baumann & Kuhl, 2003; Kuhl & Kazén, 1994). Taken together, the psychological profile of action-oriented individuals seems highly compatible with wilderness environments. Conversely, the psychological profile of state-oriented individuals seems more compatible with cultivated nature.

Both action- and state-oriented individuals are likely to be troubled by the problem of death. However, action-oriented individuals are likely to be more proficient at avoiding a full-blown confrontation with death concerns than are state-oriented individuals. Research suggests that action-oriented individuals are equipped with highly efficient suppression skills, which operate largely on unconscious levels (Jostmann, Koole, Van der Wulp, & Fockenberg, in press; Kuhl, 2001). The unconscious nature of action-oriented suppression seems adaptive, because it allows action-oriented individuals to remain focused on their goal pursuits while they are dealing with unwanted states of mind. Action-oriented individuals may thus suppress the dark side of wilderness and, consequently, be more able than state-oriented individuals to enjoy the bright side of wilderness.

Even so, action-oriented suppression skills are not without limitations. Action-oriented suppression is most likely to succeed in response to indirect death reminders (e.g., wilderness). This is because indirect death reminders can be processed at a meaningful level without fully confronting the problem of death. By contrast, when action-oriented individuals are directly confronted with the problem of death (e.g., through verbal death reminders), even the most efficient suppression skills are unlikely to keep death thoughts at bay. Consequently, direct death reminders may force action-oriented individuals to face the problem of death and, thereby, lead these individuals to respond defensively toward wilderness. Notably, this defensive position is likely to be chronic among state-oriented individuals.

The Present Research and Hypotheses

In the present studies, we sought to empirically test the foregoing analysis of human–nature relations. In Study 1, we investigated the idea that people associate death and freedom more strongly with wilderness than with cultivated nature or cities. In Study 2, we examined the influence of death reminders on evaluations of wild versus cultivated nature. We predicted that death reminders would lead participants to become less favorable toward wilderness and more favorable toward cultivated nature. In Study 3, we tested the hypothesis that action orientation is positively associated with preference for wilderness. In Study 4, we explored how action orientation regulates the psychological association between wilderness and death. Finally, in Study 5, we examined the interactive influence of subliminal death reminders and action orientation on nature evaluation.

Our analysis treats evaluations of wilderness and evaluations of cultivated nature as systemic variables, in that more positive evaluations of wilderness imply more negative evaluations of cultivated nature and vice versa. Our predictions are thus not so much concerned with evaluations of each separate nature type, as with evaluations of wilderness *relative to* participants' evaluations of cultivated nature. In statistical terms, we are concerned with variables influencing the *interaction* between evaluations of wilderness and evaluations of cultivated nature rather than with testing variables that influence evaluations of each type of nature separately (see Rosnow & Rosenthal, 1995, on the rationale of this approach; see Tesser, 1988, for an analogous systemic approach in the domain of self-evaluation).

Study 1

In Study 1, we asked participants to report how often they were inclined to think about various topics when they were in a wilderness environment relative to when they were in cultivated nature or in the city. In line with the dark side of nature, we predicted that wilderness would be more strongly associated with ruminations about death than the other environments. Notably, participants in Study 1 lived in predominantly urban environments (like the vast majority of people in the Netherlands). Participants were thus likely to have encountered many more objectively life-endangering circumstances (e.g., traffic accidents) in the city than in the wilderness. The predicted link between wilderness and death thoughts was thus presumably based on *symbolic* associations rather than on the objective statistical association between wilderness and death.

We assessed the bright side of nature by asking participants in which environment they thought most often about freedom. We chose to focus on freedom because this topic is clearly related to the bright side of wilderness, whereas freedom is not necessarily associated with death—unlike topics such as life and spirituality. Freedom is at approximately the same level of abstraction as death,

unlike topics such as discovery or exploration, which refer to concrete activities. Moreover, like death, freedom does not refer to a specific emotion, as do topics such as awe or mastery. In line with the bright side of nature, we predicted that wilderness would be more strongly associated with ruminations about freedom than would the other types of environments. Finally, given the specificity of our analysis, we predicted that wilderness would not be associated with positive or negative ruminations on topics unrelated to freedom or death.

Method

Participants. Ninety paid volunteers at the Vrije Universiteit Amsterdam (33 women and 57 men,[2] average age 23 years) participated in the experiment.

Procedure and equipment. On arrival in the laboratory, participants were seated in separate cubicles, each containing an Apple Macintosh (iMac) computer. The remaining instructions were administered via the computer. Participants were informed that the investigation consisted of a series of separate studies. The first studies were unrelated to the present research and lasted about 20 min. Participants then moved on to a questionnaire on "Environments and Thoughts." Next, all participants were asked to provide some biographical data regarding their gender and age. Finally, participants were probed regarding their perceptions of the experiment, debriefed, and paid.

Environments and Thoughts Questionnaire. In this questionnaire, participants were presented with eight different topics: relation problems, politics, family, money matters, death, art, studies, and freedom. In the first part of the questionnaire, participants were asked to choose whether they were most inclined to think about each topic in wild or cultivated nature. Wild nature was described as nature that has been hardly influenced by humans, such as an impenetrable forest, a primeval swamp, or a rain forest. Cultivated nature was described as nature that has been strongly influenced by humans, such as meadows, polders (i.e., drained marshlands), or grain fields. The instructions emphasized that the questions were not about how often participants thought in general about the topics. Rather, participants were asked to indicate how strongly they were inclined to think about the topics once they found themselves in a particular environment. The second part of the questionnaire dealt with the comparison between the city and wild nature. The city was described as an environment in which nature played almost no role, such as the downtown area of a large city, highways, or industrial areas. The third and last part of the questionnaire dealt with the comparison between cultivated nature and the city.

Results and Discussion

The results of Study 1 are shown in Table 1. As predicted, 76.7% of the participants reported that they were more inclined to think of death in the wilderness than in cultivated nature. Likewise, 68.9% of the participants were more inclined to think of death in the wilderness than in the city. In both cases, the distributions differed significantly from a 50–50 (chance) distribution ($ps < .001$). Also as predicted, wilderness was associated with thoughts about freedom. As many as 81.1% of the participants reported that they were more inclined to think of freedom in the wilderness than in cultivated nature. Likewise, 77.8% of the participants were more inclined to think of freedom in the wilderness than in the city. Again, these distributions were significantly different from chance ($ps < .001$). The double association between wilderness and thoughts about death and freedom supports the idea that wilderness activates ambivalent meanings.

Table 1
Percentages of Participants (N = 90) Inclined to Think More About Specified Topics in Wild Versus Cultivated Nature, Wild Nature Versus the City, and Cultivated Nature Versus the City, Study 1

	Comparison		
Topic	Wild > cultivated	Wild > city	Cultivated > city
Relationship problems	48.9	36.7	35.5
Politics	16.7**	8.9**	12.2**
Family	42.2	48.9	50.0
Personal finances	11.1**	2.2**	11.1**
Death	76.7**	68.9**	60.0*
Art	51.1	43.3	37.8**
Studies	12.2**	4.4**	11.1**
Freedom	81.1**	77.8**	76.7**

Note. Wild > cultivated = percentage more inclined to think about the specified topic in wild nature than in cultivated nature; wild > city = percentage more inclined to think about the specified topic in wild nature than in the city; cultivated > city = percentage more inclined to think about the specified topic in cultivated nature than in the city.
* $p < .08$. ** $p < .03$.

Participants reported that they were *less* inclined to think about politics, personal finances, and studies in the wilderness than in either a cultivated natural environment or in the city ($ps < .001$). Participants reported thinking equally often about relationship problems in each type of environment ($ps > .10$). Notably, there was a marginal trend indicating that cultivated nature was more associated with thoughts about death than the city ($p = .073$). In addition, cultivated nature was more associated with thoughts about freedom than the city ($p < .0001$). Cultivated nature thus appeared to be psychologically midway between wilderness and the city. Compared with the city, cultivated nature was somewhat more strongly associated with death and much more strongly associated with freedom. Compared with wilderness, cultivated nature was more weakly associated with death and freedom. The contrast between wilderness and cultivated nature, which is the central focus of Studies 2–5, thus renders a more conservative test of our theoretical analysis than the contrast between wilderness and the city.

Study 1 sampled only some of the wealth of different thoughts that people might entertain in wilderness, cultivated, or urban environments. Moreover, Study 1 was based on self-reports and thus might be distorted by participants' cognitive biases, cultural preconceptions, and self-presentation motives. In spite of these potential caveats, the results of Study 1 provide preliminary support for our hypothesis that the confrontation with wilderness triggers deep existential concerns about death and freedom.

[2] Throughout Studies 1–5, no reliable effects of gender emerged. Accordingly, this variable was dropped from all the analyses.

Study 2

In Study 2, we examined the effects of verbal death reminders on aesthetic evaluations of nature. Because of the link between wilderness and death, reminders of death might lead people to psychologically distance themselves from wilderness. We thus predicted that reminders of death would lead participants to rate wilderness as less beautiful. We focused on aesthetic evaluations because these are among the most validated markers of the psychological quality of nature (Daniel & Vining, 1983; Gifford, 2002; Van den Berg et al., 2003). Moreover, people are able to judge the aesthetic quality of natural landscapes intuitively, quickly, and effortlessly. The latter represents a methodological advantage, because the terror management motives that underlie distancing from nature presumably operate on intuitive levels (Goldenberg et al., 2000).

To assess participants' nature evaluations, we developed a set of verbal descriptions of a series of Dutch natural landscapes. This verbal paradigm allowed for a high level of experimental control and has been validated in previous research (De Groot & Van den Born, 2003; Van den Berg et al., in press). We focused on Dutch nature because it was most familiar to our participants. Besides perceived beauty and cultivation, we assessed two alternative landscape characteristics, that is, perceived openness and safety/familiarity. Openness and safety/familiarity are often correlated with cultivation, with typical cultivated landscapes being more open and less safe/familiar than wild landscapes, which often contain dense vegetation. Even so, cultivation cannot be reduced to openness. For instance, a polar landscape or the Sahara desert might be perceived as very open and wild at the same time. Likewise, cultivation should not be equated with safety/familiarity. Safety/familiarity relates to threats that are explicitly perceived in the environment, whereas cultivation relates to the more implicit symbolic threat that is posed by the forces of nature. Accordingly, we predicted that openness and safety/familiarity would not explain any variance over and above the variance in cultivation of the landscapes under study.

Method

Participants and design. Forty-eight paid volunteers at the Vrije Universiteit Amsterdam (27 women and 21 men, average age 22 years) were randomly assigned to the experimental conditions. The experimental design was 2 (death reminders: yes vs. no; between participants) × 2 (landscape type: wild vs. cultivated; within participant).[3] The main dependent variable consisted of participants' beauty ratings.

Procedure. The procedure and equipment were similar to Study 1. After being seated, participants were informed that the investigation consisted of a series of separate studies. The first study contained a number of personality questionnaires and our death reminder manipulation. Participants then continued with the second study, which consisted of a reaction time task and a series of word puzzles. These tasks were interpolated because mortality salience effects are most pronounced after a brief delay and distraction (Arndt, Cook, & Routledge, 2004). Participants then moved on to the third study, during which participants judged the beauty of 17 Dutch natural landscapes. Participants further judged the entire set of landscapes three additional times to indicate the cultivation, openness, and safety/familiarity of the landscapes. These perceptions were again scored on 9-point scales. To measure perceived safety/familiarity of the landscapes, we used a scale that was anchored on one side by the Dutch word *vertrouwd*, which means both "safe" and "familiar." The other side of the scale was anchored by the Dutch word *dreigend*, which translates as "threatening." Following the landscape evaluations, participants were asked to provide some biographical data regarding their gender and age. Finally, participants were probed regarding their perceptions of the experiment, debriefed, and paid. During the debriefing, 5 participants expressed suspicion about the death reminder manipulation. These participants were excluded from further analyses.

Death reminder manipulation. Death reminders were manipulated as in prior TMT research (e.g., Florian & Mikulincer, 1997). Participants in the death reminder condition rated the Dutch Fear of Death Inventory (FDI-D; Cronbach's $\alpha = .81$) before evaluating natural landscapes. The FDI-D consisted of five statements about the fear of death (e.g., "I am afraid of death, because I must part with my life when I die"; "I am afraid of death because I will stop thinking after I die"). Participants indicated their agreement with each statement on 9-point-scales (1 = *not at all*; 9 = *completely*). The FDI-D was administered at the end of the experimental session for participants in the no death reminder condition.[4]

Landscape descriptions. The stimulus set contained verbal descriptions of 17 Dutch natural landscapes that had been generated by three Dutch landscape experts. These landscapes formed a representative set of Dutch natural landscapes that varied on the cultivation dimension. Specifically, 7 descriptions referred to highly cultivated landscapes and 5 descriptions referred to wild landscapes. Examples of highly cultivated landscapes are "a large-scale landscape with fields, straight ditches and straight roads" and "a planted forest with rows of thin trees and straight roads."

[3] The analysis of variance (ANOVA) approach is conventional within social and personality research. Nevertheless, it potentially results in information loss by neglecting continuous variations in cultivation. To examine the influence of continuous variations in cultivation, we reanalyzed the data reported in Studies 2, 3, and 5 using multilevel analysis (Bryk & Raudenbusch, 1992; for an application in landscape evaluation, see Van den Berg et al., 1998). Multilevel analysis allows for the testing of our hypotheses while (a) including landscapes with an infinite range of levels of cultivation and (b) treating cultivation as a continuous variable. In our analyses, evaluations of the different landscapes were considered as lower level observations nested under the upper level unit, persons. As it turned out, the results of the multilevel analyses were highly similar to those produced by the ANOVA approach. Because the ANOVA approach is more conventional and easier to interpret for most readers, we chose to remain with the ANOVA approach in the main body of this article.

[4] Following the suggestion of an anonymous reviewer, we explored whether our results in Study 2 were moderated by explicit fear of death. From a TMT perspective, low expressed fear of death may often reflect a tendency to deny one's existential fears. Accordingly, individuals with low expressed fear of death might be especially prone to engage in intuitive terror management defenses (Greenberg et al., 1995; Harmon-Jones, Greenberg, Solomon, & Simon, 1996). To address this issue, we performed a median split on participants FDI-D scores, and performed a 2 (death reminders: yes or no) × 2 (expressed fear of death: high vs. low) between-participants ANOVA on participants' average preference for wild over cultivated nature. This analysis yielded a main effect of death reminders, $F(1, 39) = 9.18$, $p < .005$, and a marginal interaction between death reminders and expressed fear of death, $F(1, 39) = 2.95$, $p = .094$. Subsequent tests showed that death reminders led to a significant reduction in preference for wild over cultivated nature among participants with low expressed fear of death, $F(1, 39) = 10.39$, $p < .004$ ($M = .80$ vs. $M = 2.46$). Among participants with high expressed fear of death, death reminders led to a nonsignificant reduction in preference for wild over cultivated nature $F(1, 39) = 1.26$, $p = .268$ ($M = 1.02$ vs. $M = 1.48$). Although this effect might appear counterintuitive, it is consistent with TMT's reasoning that the *denial* of death anxiety causes terror management defenses to emerge, rather than death anxiety per se.

Examples of wild landscapes are "an impenetrable swamp forest, thick overgrowth, wet grounds, much plant covering" and "a dune landscape with a view over the sea, hilly, hard low bushes, sand." Pilot tests within our participant population confirmed that the cultivated landscapes were judged as high on cultivation, whereas the wild landscapes were judged as low on cultivation. The 5 remaining landscapes (included as fillers) were judged to be intermediate on cultivation.

Results

Perceived cultivation, openness, and safety/familiarity. Cultivated landscapes were indeed perceived as more cultivated than wild landscapes, $F(1, 41) = 337.41$, $p < .001$ ($M = 7.91$ vs. $M = 3.34$). Mean cultivation ratings of the five filler landscapes fell in between these ratings ($M = 5.58$). No effects of death reminders emerged on cultivation ratings (Fs < 1). As expected, wild landscapes were perceived as more closed ($M = 5.28$) and as less safe/familiar ($M = 4.88$) than cultivated landscapes (respective Ms are 3.52 and 7.18 for openness and safety/familiarity), both ps $< .01$. However, cultivated landscapes were still perceived as reliably more cultivated than wild landscapes after we statistically controlled for perceived openness and safety/familiarity as covariates (Fs > 84, ps $< .001$). Conversely, when we statistically controlled for perceived cultivation as a covariate, the differences in perceived openness and safety/familiarity between wild and cultivated landscapes fell to nonsignificance (Fs < 1). Thus, variations in perceived openness and safety/familiarity did not contribute any variance over and above the variance in perceived cultivation of the landscapes under study.

Perceived landscape beauty. We subsequently computed participants' average beauty ratings of the wild and cultivated landscapes. The resulting means were subjected to a 2×2 analysis of variance (ANOVA). This analysis yielded a significant main effect of cultivation, which indicated that wild landscapes were generally rated as more beautiful than cultivated landscapes, $F(1, 41) = 67.48$, $p < .001$ ($M = 6.66$ vs. $M = 5.49$). This effect replicates previous research that found a consistent preference for wild over cultivated Dutch landscapes among highly educated Dutch samples (Van den Berg, 2003; Van den Berg & Vlek, 1998; Van den Berg, Vlek, & Coeterier, 1998). In addition, the predicted interaction between death reminders and cultivation was obtained, $F(1, 41) = 8.18$, $p < .008$. Relevant means are presented in Table 2.

Participants who were reminded of death rated cultivated landscapes as somewhat more beautiful than participants who were not reminded of death, $F(1, 41) = 2.21$, $p = .145$ ($M = 5.49$ vs. $M = 4.95$). In addition, participants who were reminded of death rated wild landscapes as somewhat less beautiful than participants who were not reminded of death, $F(1, 41) = 2.22$, $p = .144$ ($M = 6.44$ vs. $M = 6.90$). The results can also be stated in terms of participants' relative preference for wild over cultivated landscapes. When not reminded of death, participants displayed a very strong preference for wild landscapes over cultivated landscapes, $F(1, 20) = 66.56$, $p < .001$ (M difference $= 1.95$). When reminded of death, participants displayed a much weaker preference for wild landscapes over cultivated landscapes, although this preference was still reliably different from zero, $F(1, 21) = 13.40$, $p < .005$ (M difference $= 0.95$). An ANOVA on participants' average beauty ratings of the five filler landscapes revealed no significant effects of death reminders ($F < 1$).

Table 2
Landscape Evaluations as a Function of Death Reminders and Nature Type, Study 2

Death reminder	Nature type: Cultivated *M*	Cultivated *SD*	Wild *M*	Wild *SD*
No ($n = 22$)	4.95	1.21	6.90	0.83
Yes ($n = 21$)	5.49	1.19	6.44	1.17

Note. Ratings were made on scales ranging from 1 (*not at all beautiful*) to 9 (*very beautiful*).

Discussion

As predicted, death reminders led participants in Study 2 to respond more positively toward cultivated landscapes and less positively toward wild landscapes. This finding fits with the notion that terror management concerns sensitize people to the threatening aspects of wilderness. In addition, the effects of cultivation were not mediated by differences in perceived openness or safety/familiarity between wild and cultivated landscapes. This finding suggests that the effects of death reminders and cultivation are independent of conscious feelings of threat or unfamiliarity that arise when people encounter nature. Notably, the effects of familiarity may have been minimized in Study 2 because the landscapes under study were quite familiar to our Dutch sample.

Study 3

In Study 3, we tested our prediction that action-oriented individuals would have more positive evaluations of wilderness than state-oriented individuals. We further introduced some methodological innovations. First, our stimulus set included both nature photographs and verbal descriptions. Photographic nature simulations are the most widely used paradigm in environmental psychology (Gifford, 2002; Hull & Stewart, 1992). People's evaluations of photographic nature simulations closely match their reactions to in vivo exposure to nature (Gifford, 2002; Hartig et al., 2003; Hull & Stewart, 1992) and are strongly and systematically related to alternative measures of landscape quality (Van den Berg et al., 2003). Accordingly, it seemed important to test our analysis using photographic stimuli. Second, we assessed participants' perceived complexity of the landscape photographs. We predicted that perceived complexity would not explain any variation over and above the variation in perceived cultivation of the landscapes under study.

Method

Participants and design. Sixty paid volunteers at the Vrije Universiteit Amsterdam (32 women and 28 men, average age 23) participated in the experiment. On the basis of their scores on the Threat-Related Action

Orientation (AOT)[5] Scale (Kuhl, 1994), participants were classified into action- or state-oriented individuals. Thus, the experimental design was 2 (AOT: state vs. action; between subjects) × 2 (type of nature: wild vs. cultivated; within subject). The main dependent variable consisted of participants' beauty ratings of the landscape photographs and descriptions.

Procedure. The procedure and equipment were largely similar to those used in Studies 1 and 2. After being seated, participants first completed some personality questionnaires, which included the AOT Scale. Participants then moved on to an unrelated study, which lasted about 15 min. Next, participants evaluated a series of nature photographs and nature descriptions. The verbal stimulus set consisted of the same descriptions of 17 Dutch natural landscapes that were used in Study 2. Subsequently, all participants provided some biographical data regarding their gender and age. Finally, participants were probed regarding their perceptions of the experiment, debriefed, and paid.

Measurement of action orientation. The AOT Scale has been developed and extensively validated by Kuhl and others (for an overview, see Kuhl & Beckmann, 1994a). Effects of AOT have been found across a wide range of different measures and domains, including cognitive performance, event-related brain potentials, medicine intake, therapeutic outcomes, athletic performance, and work psychology. Research indicated that the effects of AOT are not due to self-efficacy or control beliefs (Kuhl, 1981), achievement motivation (Heckhausen & Strang, 1988), neuroticism (Baumann & Kuhl, 2002), extraversion (Koole, 2004b), self-esteem (Koole & Jostmann, 2004), or conscious emotion regulation strategies (Koole, 2004b), and they occur over and above the effects of the Big Five personality dimensions (Diefendorff et al., 2000).

Each of the items of the AOT describes a particular situation that requires the use of self-regulatory skills and two alternative ways of coping with the situation. One of these alternatives always refers to action-oriented coping with the situation, whereas the other alternative refers to state-oriented coping. Illustrative items are "When I have lost something that is very valuable to me and I cannot find it anywhere": (a) "I have a hard time concentrating on anything else" or (b) "I put it out of my mind after a little while" and "When I am being told that my work is completely unsatisfactory": (a) "I do not let it bother me for too long" or (b) "I feel paralyzed." For these respective items, the action-oriented choices are b and a. For each item, participants were asked to choose which of two alternative responses would best describe their reaction. Notably, the AOT does not ask participants to provide introspective judgments of their self-regulation abilities but rather asks them to report on the consequences that these volitional abilities have for their behavior. This minimal reliance on introspection is intended to enhance the measure's ability to tap into unconscious self-regulation skills (Kuhl & Koole, 2004).

We coded action-oriented choices as 1 and state-oriented choices as 0 (Cronbach's $\alpha = .82$). Participants who made seven or more action-oriented choices on the AOT were classified as action oriented, the remaining participants were classified as state oriented. This cutoff point represents the conceptual midpoint of the AOT and was the normative midpoint in a large-scale study among Dutch university students (N = 1,460).

Nature photographs. The stimulus set consisted of 28 high-resolution color photographs of natural landscapes. These landscapes formed a representative set of West-European natural landscapes that varied in degree of human influence. Following Van den Berg et al. (1998), we restricted the kinds of human influence studied to visible signs of regulative activities, such as mowing, horticulture, and other signs of activities that indicate human control over nature. On the basis of pilot-testing studies, 13 landscapes were classified as wild natural landscapes. The remaining 15 landscapes were classified as cultivated natural landscapes. Each of the landscape photographs appeared in a 20- × 27-cm format on the computer screen. After 3 s, a 9-point rating scale was superimposed on the landscape photograph and participants were asked to type in their beauty ratings (1 = *not at all beautiful*; 9 = *very beautiful*). The landscapes were presented in a different random order for each participant. After providing beauty ratings, participants were again presented with the set of landscape photographs, this time in a 6.5- × 10.5-cm format. During this second presentation, participants rated the cultivation and complexity of the landscapes, again on 9-point scales (1 = *very little*; 9 = *very much*).

Results

Perceived cultivation and complexity. Cultivated landscape photographs were indeed perceived as more cultivated than wild landscape photographs, $F(1, 58) = 281.12$, $p < .001$ ($M = 7.24$ vs. $M = 3.67$). Perceived cultivation was unaffected by AOT, Fs < 1. Unexpectedly, wild nature photographs were perceived as less complex than the cultivated nature photographs, $F(1, 58) = 33.63$, $p < .001$ ($M = 4.71$ vs. $M = 5.60$). However, cultivated landscapes were still perceived as reliably more cultivated than wild landscapes after we statistically controlled for perceived complexity, $F(1, 58) = 157.66$, $p < .001$. Conversely, when we statistically controlled for perceived cultivation, the differences in perceived complexity between wild and cultivated landscapes fell to nonsignificance, $F(1, 58) = 1.18$, $p = .280$. Thus, perceived complexity did not vary between the wild and cultivated landscapes over and above the variance that was explained by perceived cultivation.

Perceived beauty of nature photographs. We computed participants' average beauty ratings of the photographs of wild versus cultivated landscapes and subjected these to a 2 (AOT) × 2 (nature type) ANOVA. Relevant means are displayed in the nature photograph column of Table 3. The analysis revealed a significant effect of landscape type, which indicated that wild landscapes were generally rated as more beautiful than cultivated landscapes, $F(1, 58) = 23.05$, $p < .001$ ($M = 6.55$ vs. $M = 5.94$). In addition, the predicted interaction between action orientation and nature type was significant, $F(1, 58) = 6.67$, $p < .02$. Subsequent tests revealed that only action-oriented participants displayed a clear preference for wild over cultivated landscapes, $F(1, 25) = 23.36$, $p < .001$ (M difference = 0.97). State-oriented participants, by contrast, displayed only a marginal preference for wild over cultivated landscapes, $F(1, 33) = 2.90$, $p = .098$ (M difference = 0.30). Another way to interpret this interaction is to note that action-oriented participants evaluated wild landscapes as nonsignificantly *more* beautiful than state-oriented participants, $F(1, 58) = 2.08$, $p = .155$ ($M = 6.85$ vs. $M = 6.32$), whereas action-oriented participants evaluated cultivated landscapes as nonsignificantly *less* beautiful than state-oriented participants, $F(1, 58) < 1$ ($M = 5.83$ vs. $M = 6.02$). As in Study 2, the results were stronger for relative preference for wilderness than for the separate evaluations of each nature type.

Perceived beauty of nature descriptions. We then computed participants' average beauty ratings of the verbal descriptions of wild versus cultivated landscapes. The correlation between participants' relative preference for wild over cultivated nature in photographic and verbal landscape simulations was substantial,

[5] Kuhl (1994) introduced the label "failure-related" action orientation to refer to the AOT Scale. However, we prefer the label "threat-related," because the effects of AOT are theoretically not specific to failure but rather involve a broad range of psychological threats, including negative affect (Baumann & Kuhl, 2002), external pressure (Kazén et al., 2003), and controlling relationship partners (Koole, 2004a).

Table 3
Beauty Ratings of Wild and Cultivated Nature as a Function of Type of Simulation and Action Orientation, Study 3

	Nature photographs				Nature descriptions			
	Cultivated		Wild		Cultivated		Wild	
Orientation	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Action (n = 34)	5.83	1.26	6.85	1.28	3.97	1.63	6.51	1.60
State (n = 26)	6.02	1.30	6.32	1.50	4.41	1.34	5.79	1.52

Note. Ratings were made on scales ranging from 1 (*not at all beautiful*) to 9 (*very beautiful*).

$r(60) = .75$, $p < .001$. The results for verbal descriptions converged with the results for photographic landscapes. A 2 (AOT) × 2 (nature type) ANOVA yielded an effect of landscape type, which indicated that wild landscapes were generally rated as more beautiful than cultivated landscapes, $F(1, 58) = 60.40$, $p < .001$ (M = 6.10 vs. M = 4.21). In addition, the predicted interaction between AOT and nature type was significant, $F(1, 58) = 5.29$, $p < .03$. As can be seen in the nature descriptions column of Table 3, the obtained pattern was very similar to the pattern obtained for photographic simulations. There was only one substantive difference in relation to the landscape photographs: Evaluations of cultivated landscapes were lower for the verbal descriptions than for the photographs. This difference fits with prior research showing that verbal labels that imply human influence are often negatively evaluated (Hodgson & Thayer, 1980; Tahvanainen, Tirväinen, Ihalainen, Vuorela, & Kohlemainen, 2000).

Discussion

As predicted, action-oriented participants displayed a stronger preference for wild nature than state-oriented participants, across evaluations of both landscape photographs and verbal descriptions. The close convergence between photographs and verbal descriptions attests to the robustness of the effects of action orientation and validates the use of verbal descriptions of nature in Studies 1–3. Additional analyses showed that wild landscapes were perceived as *less* complex than cultivated landscapes, even though wild landscapes were generally rated as more beautiful than cultivated landscapes. Though we did not explicitly predict this finding, it is consistent with our theoretical perspective. Even when wilderness is perceptually simple (e.g., the Sahara desert), its uncontrollability may signal a lack of existential security. Notably, our analyses indicated that differences in perceived complexity did not contribute any variance over and above the variance that was explained by perceived cultivation of the landscapes in Study 3. Thus, even though wild landscapes were perceived as less complex than cultivated landscapes, this effect could not explain the effects of cultivation on beauty ratings.

Study 4

Why would action orientation be associated with more positive evaluations of wilderness? On the basis of PSI theory (Kuhl, 2000; Kuhl & Koole, 2004), we suspect that action-oriented individuals are more efficient at suppressing the association between wilderness and death than state-oriented individuals. Presumably, action-oriented suppression is mediated by nonconscious mechanisms that are more effective than consciously intended suppression, which often leads to a rebound of unwanted mental contents (Wegner, 1994). By suppressing the dark side of wilderness, action-oriented individuals may be able enjoy the bright side of wilderness more than state-oriented individuals.

In Study 4, we took a closer look at the suppression skills of action- versus state-oriented individuals. To this end, we first exposed participants to a series of photographs of wilderness. This manipulation was expected to trigger suppression of the dark side of wilderness among action-oriented participants. To track the dynamics of the suppression process, we used a primed lexical-decision task. In this task, participants had to decide whether letter strings on a computer screen are words or nonwords. Among the target letter strings, we included words related to mortality, vitality, punishment, and reward. Prior to the presentation of each target letter string, we briefly primed either words related to wilderness or words related to cultivated nature. On the basis of past research, strength of associations was indicated by the facilitation or inhibition of lexical-decision latencies due to the lexical primes (e.g., Koole, Smeets, Van Knippenberg, & Dijksterhuis, 1999; Mussweiler & Förster, 2000; Wentura, 2000). Because the lexical-decision task did not include neutral primes, we use the terms *facilitation*, *inhibition*, and *suppression* only in a relative sense.

Our key prediction in Study 4 was that action-oriented participants would suppress the association between wilderness and death after viewing wilderness photographs. Action-oriented individuals should therefore display a slowdown in lexical-decision latencies to mortality words that were primed with wilderness words rather than cultivated nature words. This suppression effect was not predicted to occur among state-oriented individuals, who presumably are not equipped with the same suppression skills as action-oriented individuals. After being primed with wilderness photographs, state-oriented individuals were expected to show an association between wilderness and death. State-oriented individuals should therefore display faster lexical decisions to mortality words that were primed with wilderness words rather than cultivated nature words.

Study 4 also included a control group of participants who were exposed to photographs of cultivated nature. We expected that this control condition would not trigger suppression among action-oriented participants. Thus, after viewing cultivated nature, action-

orientated participants were expected to display an association between wilderness and mortality. By contrast, we reasoned that viewing cultivated nature might help state-oriented participants to inhibit the association between wilderness and death. This is because cultivated nature symbolically conveys that human civilization can control the wild forces of nature. Past research has indeed found that state-oriented individuals benefit greatly from an emotionally supportive environment (Koole, Kuhl, Jostmann, & Vohs, 2005). Viewing cultivated nature might thus allow state-oriented individuals to disconnect nature from their concerns with death. We did not predict the latter effect for action-oriented participants, because action-oriented individuals are inclined to shield themselves against social influences, even when these influences are emotionally comforting (Koole, 2004a; Kuhl & Kazén, 1994).

Method

Participants and design. Forty-eight paid volunteers at the Vrije Universiteit Amsterdam (29 women and 19 men, average age 21 years) participated in the experiment. On the basis of their scores on the AOT Scale, we classified participants as action- or state-oriented individuals. Thus, the experimental design was 2 (AOT: action vs. state; between participants) × 2 (photographic prime: wild vs. cultivated nature; between participants) × 2 (lexical prime: wild vs. cultivated nature; within participants) × 2 (target category: natural vs. social; within participants) × 2 (target valence: negative vs. positive; within participants).

Procedure. The procedure and equipment were similar to those used in Studies 1–3. After being seated, participants first completed some personality questionnaires, which included the AOT Scale ($\alpha = .83$). Next, participants performed a dot-recognition task that contained our nature photograph priming manipulation. Following the dot-recognition task, participants continued with an unrelated filler task, which lasted about 5 min. Participants then proceeded with the primed lexical-decision task. Participants subsequently completed some unrelated studies and provided some biographical data then were debriefed and paid.

Photographic priming. Participants were told that the investigators were interested in the speed of visual perception processes. During the task, photographs of landscapes would be flashed on the computer screen. In between these landscapes, red dots would appear on the screen. Participants' task was to count the number of red dots in between the landscapes. Participants were shown two sets of landscapes. The first set consisted of six landscapes that were interspersed with four red dots, the second set consisted of five landscapes that were interspersed with three red dots. The landscapes and dots were presented for about 100 ms before they were replaced by the next stimulus. We used these brief presentations to ensure that we evoked participants' intuitive reactions to the landscapes. In the wilderness photographs condition, the two sets of landscapes consisted of Dutch natural landscapes that had been pretested as relatively wild. In the cultivated nature photographs condition, the two sets of landscapes consisted of Dutch natural landscapes that had been pretested as relatively cultivated.

Primed lexical-decision task. During the lexical-decision task, participants were informed that a number of letter strings would appear individually in the center of the computer screen. Some of these strings would be genuine words, whereas others would be nonwords. Participants were to decide as quickly and accurately as possible whether the presented letter string was a word or nonword. Each trial began with the presentation of a row of five *x*s that remained in the center of the computer screen for 1 s. The *x*s were replaced by a priming word, which remained on the computer screen for 16 ms. Previous research has shown that prime words cannot be consciously detected at such brief intervals (Arndt et al., 2004). The priming word was replaced by the target letter string, which remained on screen until participants had pressed an appropriate response button. If the letter string was an existing word, participants had to press the "A" button (left of the keyboard); if the letter string was a nonword, participants had to press the "6" button (right of the keyboard).

After 4 warm-up trials, participants proceeded with 112 experimental trials. Half of these trials had words as targets: seven words were related to nature and mortality (*cadaver, skull, maggots, decomposition, fatal, corpse, cancer*), seven words were related to nature and vitality (*flowers, birds, spacious, creek, blossom, water, nature*), seven words were related to social punishment (*punishment, hate, scold, badger, mean, lie, sneaky*), and seven words were related to social reward (*reward, love, kiss, stroke, tender, truth, honest*). The target words were presented twice: once preceded by one of seven wilderness primes (*prairie, swamp, desert, savannah, primeval forest, wilderness, jungle*) and once preceded by one of seven cultivated nature primes (*meadow, polder, community garden, park, public garden, field, golf course*). Each prime word was paired equally often with one of the four target categories. Note that the prime words were all single words in Dutch, because subliminal priming effects are most reliable for single words (Greenwald, 1992). The remaining half of the experimental trials had nonwords as targets. The presentation order of the trials was randomized for each participant, and response latencies were recorded using appropriate software.

Results

Before analyzing the results, we first removed wrong responses from the lexical-decision task (1.5% of all responses). To reduce skewness of the data, we converted lexical-decision latencies longer than 1,000 ms (i.e., more than 3 standard deviations above the mean; 6.8% of all responses) into 1,000 ms.

We subjected average lexical-decision latencies to a 2 (AOT) × 2 (photographic prime) × 2 (lexical prime) × 2 (target category) × 2 (target valence) ANOVA. The analysis yielded a main effect of target valence, which indicated that lexical decisions were faster to positive than to negative targets, $F(1, 44) = 51.35$, $p < .001$ ($M = 623$ vs. $M = 655$). The analysis further yielded a set of two-, three-, and four-way interactions and the predicted five-way interaction between AOT, photographic prime, lexical prime, target category, and target valence, $F(1, 44) = 3.90$, $p = .055$. The latter effect indicated that it was appropriate to analyze the results separately by target category. For each word type, we found a significant two-way interaction between AOT and photographic prime (ps $< .05$). Across each word type, action-oriented participants generally displayed slower lexical decisions after viewing wild rather than cultivated nature, $F(1, 44) = 3.99$, $p = .052$ ($M = 679$ vs. $M = 622$). State-oriented participants displayed a trend in the opposite direction, but this effect was not significant, $F(1, 44) = 1.48$, $p = .228$ ($M = 606$ vs. $M = 643$). No other effects emerged for words related to vitality, punishment, and reward.

For mortality words, the analysis also yielded a three-way interaction between AOT, photographic prime, and lexical prime, $F(1, 44) = 23.26$, $p < .001$. Relevant means are displayed in Table 4. We proceeded with more focused tests. In the condition in which participants had been exposed to wild nature photographs, there emerged a main effect of AOT, $F(1, 22) = 7.05$, $p < .02$, consistent with slower lexical decisions among action- versus state-oriented participants ($M = 716$ vs. $M = 633$). There was also an interaction between AOT and lexical prime, $F(1, 22) = 15.14$, $p < .002$. After viewing wild nature, action-oriented participants were slower to respond to mortality words when these were primed by wilderness words rather than cultivated nature words, $F(1,$

Table 4
Lexical Decision Latencies of Natural Mortality Words as a Function of Action Orientation, Photographic Priming, and Subliminal Lexical Priming, Study 4

	Photographic Prime			
	Wilderness		Cultivated Nature	
	Subliminal lexical prime		Subliminal lexical prime	
Orientation	Wilderness	Cultivated nature	Wilderness	Cultivated nature
Action				
M	737	695	631	662
SD	90	98	54	73
State				
M	611	653	689	654
SD	61	98	107	91

12) = 8.23, $p < .02$ ($M = 737$ vs. $M = 695$). By contrast, after viewing wild nature, state-oriented participants were quicker to respond to mortality words when these were primed by wilderness words rather than cultivated nature words, $F(1, 10) = 7.02$, $p < .03$ ($M = 611$ vs. $M = 654$).

In the condition in which participants had been exposed to cultivated nature photographs, there was also an interaction between AOT and lexical prime, $F(1, 22) = 8.68$, $p < .008$. However, the pattern of means was opposite to the pattern in the wild nature photographs condition. After viewing cultivated nature, action-oriented participants were quicker to respond to mortality words when these were primed by wilderness words rather than cultivated nature words, $F(1, 12) = 5.01$, $p < .05$ ($M = 631$ vs. $M = 662$). By contrast, after viewing cultivated nature, state-oriented participants were somewhat slower to respond to mortality words when these were primed by wilderness words rather than cultivated nature words, $F(1, 10) = 3.77$, $p = .081$ ($M = 689$ vs. $M = 655$).

Discussion

After viewing wilderness, action-oriented participants' responses to death words were inhibited by priming wilderness words. This finding supports the notion that action-oriented individuals suppress the association between wilderness and death after viewing wilderness. Notably, after action-oriented participants viewed cultivated nature, their responses to death words were facilitated by priming wilderness words. The latter finding may be interpreted in terms of the terror management needs of action-oriented individuals. Cultivated nature symbolizes the taming of the forces of nature. Thus, when individuals are exposed to cultivated nature, the association between wilderness and death is unlikely to give rise to terror management concerns. By contrast, wilderness conveys no symbolic taming of the forces of nature. Thus, when individuals are exposed to wilderness, the association between wilderness and death is likely to trigger terror management concerns. Overall, it appears that action-oriented individuals only suppress the association between wilderness and death when doing so serves their terror management needs. This sensitivity to context suggests that action-oriented individuals are quite flexible in their suppression processes, even though these processes unfold on subliminal levels (see also Koole & Jostmann, 2004; Koole & Kuhl, in press).

There was an unexpected slowdown in lexical-decision latencies among action-oriented participants after viewing wilderness. In prior research, such a slowdown in responding has been associated with bringing self-regulation processes online (Kazén, Baumann, & Kuhl, 2003). The observed slowdown in lexical decision times among action-oriented participants thus suggests that action-oriented participants used active self-regulation in coping with the dark side of wilderness. This additional evidence therefore fits with our reasoning that action-oriented individuals engaged in more self-regulation processes after viewing wilderness than after viewing cultivated nature.

State-oriented participants displayed a complete reversal of the associations that were found among action-oriented participants. After viewing wilderness, state-oriented participants activated the association between wilderness and death. This effect suggests that encounters with wilderness serve to potentiate automatic associations between wilderness and death among state-oriented participants. After viewing cultivated nature, however, state-oriented participants displayed an inhibited association between wilderness and death. Presumably, encounters with cultivated nature provide state-oriented individuals with symbolic assurance that the wild forces of nature can be controlled by human civilization.

Study 5

On the basis of Study 4's findings, action-oriented individuals seem particularly efficient in suppressing death thoughts in their encounters with wilderness. However, there are times when the psychological confrontation with death may be inevitable even for action-oriented individuals. When exposed to direct death reminders, even the most efficient suppression skills are unlikely to keep death thoughts at bay. Consequently, direct death reminders may sensitize action-oriented individuals to the dark side of wilderness and thereby lower their evaluations of wilderness. By contrast, as Study 4 indicates, merely viewing wilderness seems already sufficient to highlight the problem of death among state-oriented individuals. Consequently, direct death reminders might have no added impact on state-oriented individuals' evaluations of wilderness.

We designed Study 5 to address the interactive effects of action orientation and direct death reminders on nature evaluation. We further included some additional methodological improvements. First, we used a subliminal priming method to manipulate direct death reminders (Arndt, Greenberg, Solomon, & Pyszczynski, 1997). Second, we contrasted death priming with both neutral and aversive priming control conditions. In the neutral priming condition, participants were subliminally primed with four *x*s. In the aversive priming condition, participants were subliminally primed with the word *pain.* This second control condition allowed us to examine whether our results were indeed specific to death concerns or whether they were due to general accessibility of aversive cognitions. Finally, we included a systematic assessment of participants' mood changes. Past TMT research has found little evidence that verbal death primes influence mood, even though verbal death primes reliably elicit defensive responses (Greenberg,

Solomon, & Pyszczynski, 1997). We therefore predicted no effects of subliminal death reminders on subjective mood.

Method

Participants and design. One hundred fifteen paid volunteers at the Vrije Universiteit Amsterdam (72 women and 43 men, average age 23 years) participated in the experiment. On the basis of their scores on the AOT Scale, we classified participants into action- versus state-oriented individuals. Thus, the experimental design was 2 (AOT: state vs. action; between participants) × 3 (subliminal priming: xxxx vs. death vs. pain; between participants) × 2 (nature type: wild vs. cultivated; within participants).

Procedure. The procedure and equipment were similar to those used in Study 2. Participants first completed some personality questionnaires, which included the AOT Scale (Cronbach's $\alpha = .80$). Next, participants rated their moods. Participants then moved on to a study "on word associations," which contained our subliminal priming manipulation. Following this task, participants rated their moods for a second time and performed a brief filler task. After this, participants evaluated the same set of landscape photographs as in Study 3, completed another filler, and rated their moods for a third time. Subsequently, all participants provided some biographical data regarding their gender and age. Finally, participants were probed regarding their perceptions of the experiment, debriefed, paid, and dismissed.

Subliminal priming manipulation. The subliminal priming task was modeled after Arndt et al. (1997). Participants were told that for each trial of the word-completion test, two words would be presented sequentially on the computer screen. Some of these word pairs were related, such as *rose* and *flower*, whereas other word pairs were unrelated, such as *cabbage* and *rope*. After each word pair, participants were asked to type "1" to signify that the words were unrelated or "2" to signify that the words were related. Participants were instructed to keep their eyes fixed on the center of the screen because the word pairs would be presented very briefly on the computer screen. Participants were also told that the computer would randomly select a second word from a list after the presentation of the first word, so that they might sometimes see a brief flash in between the presentation of the two words. After these instructions, participants received two practice items. The correct answer to these items was provided, and participants were offered the opportunity to practice again if they wished.

Participants proceeded with the word-relation test. Each of the 10 trials consisted of a sequential presentation of three stimuli centered on the screen. The first and third words were the words for which the participants were supposed to determine the presence or absence of a relationship. In reality, these words served as a forward mask (and fixation point) and backward mask, respectively. The critical subliminal prime was presented between the two mask words for 34 ms. In the death priming condition, the subliminal prime was *dood* (Dutch for *death* or *dead*). In the xxxx priming condition, the subliminal prime was a string of four *x*s. In the pain priming condition, the subliminal prime was *pijn* (Dutch for *pain*).

Mood measurement. During the three consecutive mood assessments, participants rated the brief Profile of Mood Scales (POMS; Shacham, 1983) that were translated into Dutch (Van den Berg et al., 2003). The 32 POMS items formed five subscales, which assessed feelings of depression, anger, tension, vigor, and anxiety. Cronbach's alphas for the POMS scales ranged between .83 and .95 across the three separate measurements.

Results

Subliminality check. At the end of the experiment, participants were probed regarding their awareness of the subliminal primes that were presented during the word-relation test, using a funneled debriefing procedure (Bargh & Chartrand, 2000). During this procedure, 5 participants claimed that they had seen an additional word being flashed on the computer screen in between the two test words. These 5 participants were unable to guess which word had been flashed when the priming word was presented along with three alternative words. Even so, they might have been able to detect some of the subliminal primes. Hence, we removed the 5 suspicious participants from the dataset.

Perceived cultivation and complexity. Participants perceived the cultivated landscapes to be more cultivated than the wild landscapes, $F(1, 110) = 719.25$, $p < .001$ ($M = 7.19$ vs. $M = 3.77$). Perceptions of cultivation were not affected by AOT or the subliminal priming manipulation (Fs < 1). As in Study 3, wild nature was perceived as less complex than cultivated nature, $F(1, 110) = 87.25$, $p < .001$ ($M = 4.52$ vs. $M = 5.60$). However, the cultivated landscapes were still perceived as reliably more cultivated after we statistically controlled for perceived complexity as a covariate, $F(1, 109) = 370.91$, $p < .001$. Conversely, when we statistically controlled for perceived cultivation as a covariate, the differences in perceived complexity between wild and cultivated landscapes fell to nonsignificance, $F(1, 109) < 1$. Thus, variations in perceived complexity did not contribute any variance over and above the difference in perceived cultivation between the wild versus cultivated landscapes.

Beauty ratings. We subjected participants' average beauty ratings to a 2 (AOT) × 3 (subliminal priming) × 2 (nature type) ANOVA. This analysis yielded a main effect of nature type, $F(1, 105) = 46.57$, $p < .001$, which indicated that average beauty ratings for wild nature were higher than average beauty ratings for cultivated nature ($M = 6.37$ vs. $M = 5.69$). In addition, the analysis revealed a two-way interaction between AOT and subliminal priming, $F(2, 105) = 3.32$, $p < .05$, a two-way interaction between AOT and nature type, $F(1, 105) = 5.00$, $p < .03$, and the predicted three-way interaction between AOT, subliminal priming, and nature type, $F(2, 105) = 4.66$, $p < .02$. Relevant means are displayed in Table 5.

To facilitate interpretation of the results, we subtracted participants' evaluations of cultivated nature from their evaluations of wild nature, such that higher scores indicated greater preference for wilderness. We then conducted separate tests among action- and state-oriented individuals. Among state-oriented individuals, subliminal priming had no significant effects (ps $> .10$). By contrast, among action-oriented individuals, subliminal priming

Table 5
Beauty Ratings of Wild and Cultivated Nature as a Function of Subliminal Priming and Action Orientation, Study 5

	Action orientation			State orientation		
Subliminal prime	xxxx	Pain	Death	xxxx	Pain	Death
Wild nature						
M	6.65	7.31	6.08	6.17	5.95	6.70
SD	1.11	0.57	1.32	1.38	1.38	1.02
Cultivated nature						
M	5.25	6.04	5.67	5.81	5.61	5.85
SD	1.37	1.19	1.08	1.14	0.99	1.27

Note. Ratings were made on scales ranging from 1 (*not at all beautiful*) to 9 (*very beautiful*).

significantly influenced preference for wilderness, $F(2, 42) = 3.64$, $p < .04$. Follow-up tests showed that action-oriented participants primed with *xxxx* or *pain* had an equally strong preference for wilderness, $F < 1$ ($M = 1.40$ vs. $M = 1.27$). Action-oriented participants who had been primed with *death*, however, had lower preference for wilderness than action-oriented participants primed with *xxxx*, $F(1, 42) = 6.17$, $p < .02$ ($M = .41$ vs. $M = 1.27$), and action-oriented participants primed with *pain*, $F(1, 42) = 3.87$, $p = .056$ ($M = .41$ vs. $M = 1.40$). Another way to interpret the interaction pattern is to note that action-oriented participants had a stronger relative preference for wilderness than state-oriented participants after being primed with *xxxx*, $F(1, 36) = 8.65$, $p < .007$, and after being primed with *pain*, $F(1, 34) = 7.10$, $p < .02$. After being primed with *death*, however, action-oriented participants had an equally low preference for wilderness as state-oriented individuals ($F < 1$).

We also examined our results separately for wild versus cultivated nature. For beauty ratings of cultivated nature, no significant effects emerged ($ps > .10$). For beauty ratings of wild nature, the analysis revealed a marginal main effect of AOT, $F(1, 105) = 2.84$, $p = .095$, which was qualified by an interaction effect between AOT and subliminal priming, $F(2, 105) = 5.53$, $p < .006$. Subsequent tests revealed that action-oriented participants rated wild nature as nonsignificantly *more* beautiful than state-oriented participants after being primed with *xxxx*, $F(1, 36) = 1.30$, $p = .265$, and significantly so after being primed with *pain*, $F(1, 34) = 9.67$, $p < .005$. After being primed with *death*, however, action-oriented participants rated wild nature as nonsignificantly *less* beautiful than state-oriented participants, $F(1, 35) = 2.53$, $p = .120$. Overall, as in Studies 2 and 3, the effects were stronger for relative preference than for absolute beauty ratings of wilderness.

Mood ratings. Mood ratings were scored such that higher ratings signified higher negative affect (all Cronbach's αs $> .95$). We performed a 2 (AOT) $\times$ 3 (subliminal priming) $\times$ 3 (time) ANOVA on participants' average mood ratings. The analysis revealed no effects of subliminal priming ($ps > .10$). Similar results were found when the subscales of the POMS were analyzed separately. Average mood ratings were uncorrelated with ratings of wild or cultivate nature ($ps > .10$) and the results obtained for beauty ratings did not change when mood ratings were included as covariates.

Discussion

As predicted, subliminal death reminders inhibited the influence of action orientation on nature evaluation. When participants were subliminally primed with neutral words or pain, action orientation was positively related to preference for wilderness. The nondeath priming conditions thus mirrored the results of Study 3. However, when participants were subliminally primed with death, the influence of action orientation on preference for wilderness was eliminated.

State-oriented participants displayed relatively low evaluations of wilderness regardless of whether they were primed with death or not. The lower reactivity of state-oriented participants compared with their action-oriented counterparts to verbal death reminders may be explained by Study 4's observation that state-oriented participants activate death thoughts in response to wilderness even in the absence of direct death reminders. Accordingly, the death primes in Study 5 may not have affected state-oriented participants because state-participants were already attuned to the psychological threat of wilderness.

Unexpectedly, death priming led to a nonsignificant trend among state-oriented participants to increase their preference for wilderness. It should be noted that this trend did not contribute to the statistical significance of our predicted effects, because our results were reliable even when action-oriented participants were considered separately. Speculatively, the confrontation with the double threat of death reminders and wilderness may have led some state-oriented individuals to downplay the threat of wilderness on a conscious level. This conscious strategy may be analogous to the trivialization strategies that people use to reduce cognitive dissonance after alternative dissonance reduction strategies have been blocked (Simon, Greenberg, & Brehm, 1995). However, we caution against heavy-handed interpretations of the effect of subliminal death priming among state-oriented participants, given that this effect was not statistically reliable.

Some other aspects of Study 5 are also noteworthy. First, pain primes did not yield similar effects as death primes. Thus, our central results appear to be uniquely due to death concerns, as opposed to any kind of negative rumination. Second, Study 5 found no evidence that the effects of verbal death primes and action orientation on nature evaluation were mediated by changes in subjective mood, a finding that is consistent with previous TMT research (Arndt et al., 2004). Finally, Study 5 replicated Study 3's finding that the effects of wild versus cultivated nature were not mediated by differences in perceived complexity between these different nature types.

Would we have obtained similar results if we had used supraliminal death reminders? Although we do not have direct evidence on this matter, Study 4 showed that the effects of action orientation are capable of operating on subliminal levels. Moreover, past TMT research indicates that the effects of subliminal death primes are qualitatively similar to the effects of supraliminal death primes (Arndt et al., 2004). Finally, Kazén, Baumann, and Kuhl (2004) found that action-oriented individuals show increases in worldview defense after supraliminal death primes, even to a greater degree than state-oriented individuals. Although more research is needed, the available evidence suggests that supraliminal death primes are likely to have similar effects on nature evaluation as subliminal death primes.

General Discussion

The present findings confirm the relevance of terror management motives in human–nature relations (Goldenberg et al., 2000). Indeed, Study 1 showed that wilderness environments were more strongly associated with death ruminations than were cultivated or urban environments. On the basis of the psychological association between wilderness and death, we hypothesized that terror management concerns may sensitize people to the dark side of wilderness. Consistent with this, Study 2 showed that death reminders subdued people's appreciation of the beauty of wilderness. Study 4 found evidence that associations between wilderness and death are even influential on subliminal levels. Importantly, both Studies 1 and 4 showed that wilderness was not associated with negative ruminations in general. The dark side of wilderness thus relates

specifically to the problem of death (Koole & Van den Berg, 2004).

Some people seem capable of suppressing the dark side of wilderness. Indeed, Study 4 found that action-oriented individuals unconsciously suppressed the association between wilderness and death after encountering wilderness. Even so, action-oriented individuals cannot completely escape the dark side of wilderness. Study 5 showed that direct reminders of death can induce action-oriented individuals to lower their evaluations of wilderness. Thus, even highly efficient suppression skills may not compensate for the increase in death-thought accessibility that results from direct death reminders. As Study 4 showed, state-oriented individuals are not equipped with the same suppression skills as action-oriented individuals. It thus seems understandable that state-oriented individuals had a markedly lower appreciation of wilderness relative to action-oriented individuals in Studies 3 and 5. By contrast, state-oriented individuals appear to be relatively favorably disposed toward cultivated nature. Cultivated nature may thus provide the most suitable setting for state-oriented individuals to enjoy some of the positive benefits of nature.

The present research also found support for a bright side of wilderness. First, Study 1 showed that participants were more inclined to think about freedom in the wilderness than in either cultivated nature or the city. Second, there was a general trend among participants in Studies 2, 3, and 5 to rate wilderness as relatively beautiful. Indeed, the lowest average beauty rating of wilderness in the present research was 5.79, which is well above the conceptual midpoint of the 9-point scales that were being used. This general liking of wilderness, at least on the surface, might seem at odds with our contention that wilderness is intrinsically associated with terror management concerns. However, participants in the present research were judging wilderness landscapes in the safety and comfort of a psychological laboratory. Within this artificial context, levels of psychological threat that were associated wilderness were probably minimal. People's affective reactions toward wilderness are likely to be more intense during actual wilderness experiences, for instance during heavy storms or encounters with wild animals (Van den Berg & Ter Heijne, 2004). Under more realistic conditions, therefore, the influence of terror management concerns on nature evaluation may be considerably enhanced.

Limitations and Future Perspectives

The present research only studied reactions to simulated environments. Fortunately, people's reactions to simulated and actual environments show considerable convergence (Coeterier, 1983; Gifford, 2002; Hull & Stewart, 1992). There are thus grounds to believe that the present results will generalize to real-life encounters with nature. Another limitation is that the present research used only Dutch participants. There is reason to suspect, however, that our findings are relevant to other cultures as well. Investigations in other countries, such as the United States, have corroborated people's fears of wilderness (Bixler & Floyd, 1997) and the importance of having an action-oriented mindset to overcome such fears (Kaplan & Kaplan, 1989; Korpela, Hartig, Kaiser, & Führer, 2001). Still, it would be important to extend the present findings to other cultures, in particular cultures that advocate more ecocentric views on human–nature relations (Buttel, 1987; Catton & Dunlap, 1980).

Though many questions await future research, the present research attests to the great potential for integration between personality/motivation theory and environmental psychology. Traditionally, these areas have been largely separate domains of inquiry. In recent years, however, there has been a growing interest in how motivation and personality interface with the physical environment (Aarts & Dijksterhuis, 2003; Gosling, Ko, Mannarelli, & Morris, 2002; Koole & Van den Berg, 2004). In view of these promising developments, future theory and research may benefit enormously from a continued interchange between environmental psychology and research on personality and motivation processes.

Concluding Remarks

People have longed to live in harmony with nature ever since human civilization created a rift between *homo sapiens* and other life forms. Yet with today's growing list of environmental problems, the ideal of striking a perfect balance between civilization and nature seems ever more difficult to attain. In the present research, we have proposed that some of the roots of the perennial conflict between people and nature may lie at the core of the human psyche, in people's difficulty in coming to terms with their own finitude. People may thus need to reconcile themselves with their own deepest anxieties before they can engage in more positive exchanges with the natural environment. To live in harmony with nature, people must first find harmony within themselves.

References

Aarts, H., & Dijksterhuis, A. (2003). The silence of the library: Environment, situational norm, and social behavior. *Journal of Personality and Social Psychology, 84,* 18–28.

Appleton, J. (1975). *The experience of landscape.* London: Wiley.

Arndt, J., Cook, A., & Routledge, C. (2004). The blueprint of terror management: Understanding the cognitive architecture of psychological defense against the awareness of death. In J. Greenberg, S. L. Koole, & T. Pyszczynski (Eds.), *Handbook of experimental existential psychology* (pp. 35–53). New York: Guilford Press.

Arndt, J., Greenberg, J., Solomon, S., & Pyszczynski, T. (1997). Subliminal exposure to death-related stimuli increases defense of the cultural worldview. *Psychological Science, 8,* 379–385.

Bargh, J. A., & Chartrand, T. L. (2000). Studying the mind in the middle: Priming and automaticity research. In H. Reis & C. Judd (Eds.), *Handbook of research methods in social psychology* (pp. 253–285). New York: Cambridge University Press.

Baumann, N., & Kuhl, J. (2002). Intuition, affect, and personality: Unconscious coherence judgments and self-regulation of negative affect. *Journal of Personality and Social Psychology, 83,* 1213–1223.

Baumann, N., & Kuhl, J. (2003). Self-infiltration: Confusing assigned tasks and self-selected in memory. *Personality and Social Psychology Bulletin, 29,* 487–498.

Baumeister, R. F., Heatherton, T. F., & Tice, D. M. (1994). *Losing control: How and why people fail at self-regulation.* New York: Academic Press.

Becker, E. (1962). *The birth and death of meaning.* New York: Free Press.

Becker, E. (1973). *The denial of death.* New York: Free Press.

Bixler, R. D., & Floyd, M. F. (1997). Nature is scary, disgusting, and uncomfortable. *Environment and Behavior, 29,* 443–467.

Bryk, A. S., & Raudenbusch, S. W. (1992). *Hierarchical linear models: Applications and data analysis methods.* Newbury Park, CA: Sage.

Burke, E. (1999). *A philosophical enquiry into the origin of our ideas of the*

sublime and beautiful: And other pre-revolutionary writings (D. Womersley, Ed.). London: Penguin. (Original work published 1757)

Buttel, F. H. (1987). New directions in environmental psychology. *Annual Review of Sociology, 13,* 465–488.

Catton, W. R., & Dunlap, R. E. (1980). A new environmental paradigm for post-exuberant sociology. *American Sociologist, 13,* 41–49.

Coeterier, J. F. (1983). A photo validity test. *Journal of Environmental Psychology, 3,* 315–323.

Daniel, T. C., & Vining, J. V. (1983). Methodological issues in the assessment of landscape quality. In I. Altman & J. F. Wohlwill (Eds.). *Human behavior and environment: Advances in theory and research* (Vol. 6, pp. 39–83). New York: Plenum Press.

De Groot, W. T., & Van den Born, R. J. G. (2003). Visions of nature and landscape type preferences: An exploration in the Netherlands. *Landscape and Urban Planning, 63,* 127–138.

Diefendorff, J. M., Hall, R. J., Lord, R. G., & Strean, M. L. (2000). Action-state orientation: Construct validity of a revised measure and its relationship to work-related variables. *Journal of Personality and Social Psychology, 85,* 250–263.

Eisenberg, E. (1998). *The ecology of Eden: An inquiry into the dream of paradise and a new vision of our role in nature.* New York: Random House.

Florian, V., & Mikulincer, M. (1997). Fear of death and the judgment of social transgressions: A multidimensional test of terror management theory. *Journal of Personality and Social Psychology, 73,* 369–380.

Gifford, R. (2002). *Environmental psychology: Principles and practice* (3rd ed.). Colville, WA: Optimal Books.

Goldenberg, J., Pyszczynski, T., Greenberg, J., & Solomon, S. (2000). Fleeing the body: A terror management perspective on the problem of corporeality. *Personality and Social Psychology Review, 4,* 200–218.

Goldenberg, J., Pyszczynski, T., Greenberg, J., Solomon, S., Kluck, B., & Cornwell, R. (2001). I am *not* an animal: Mortality salience, disgust, and the denial of human creatureliness. *Journal of Experimental Psychology: General, 130,* 427–435.

Goldenberg, J., & Roberts, T. (2004). The beast within the beauty: An existential perspective on the objectification and condemnation of women. In J. Greenberg, S. L. Koole, & T. Pyszczynski (Eds.), *Handbook of experimental existential psychology* (pp. 71–85). New York: Guilford Press.

Gosling, S. D., Ko, S. J., Mannarelli, T., & Morris, M. E. (2002). A room with a cue: Personality judgments based on offices and bedrooms. *Journal of Personality and Social Psychology, 82,* 379–398.

Greenberg, J., Simon, L., Harmon-Jones, E., Solomon, S., Pyszczynski, T., & Lyon, D. (1995). Testing alternative explanations for mortality salience effects: Terror management, value accessibility, or worrisome thoughts? *European Journal of Social Psychology, 25,* 417–433.

Greenberg, J., Solomon, S., & Pyszczynski, T. (1997). Terror management theory of self-esteem and cultural worldviews: Empirical assessments and conceptual refinements. In M. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 29, pp. 61–139). New York: Academic Press.

Greenwald, A. G. (1992). New Look 3: Unconscious cognition reclaimed. *American Psychologist, 47,* 766–779.

Gross, J. J. (1999). Emotion regulation: Past, present, future. *Cognition and Emotion, 13,* 551–573.

Harmon-Jones, E., Greenberg, J., Solomon, S., & Simon, L. (1996). The effects of mortality salience on intergroup bias between minimal groups. *European Journal of Social Psychology, 26,* 667–681.

Hartig, T., & Evans, G. W. (1993). Psychological foundations of nature experience. In T. Gärling & R. G. Golledge (Eds.), *Behavior and environment: Psychological and geographical approaches* (pp. 427–457). Amsterdam: Elsevier Science.

Hartig, T., Evans, G. W., Jamner, L. D., Davis, D. S., & Gärling, T. (2003). Tracking restoration in natural and field settings. *Journal of Environmental Psychology, 23,* 109–123.

Hartig, T., Kaiser, F. G., & Bowler, P. A. (2001). Psychological restoration in nature as a positive motivation for ecological behavior. *Environment and Behavior, 33,* 590–607.

Heckhausen, H., & Strang, H. (1988). Efficiency under record performance demands: Exertion control-an individual difference variable? *Journal of Personality and Social Psychology, 55,* 489–498.

Hodgson, R. W., & Thayer, R. L. (1980). Implied human influence reduces landscape beauty. *Landscape Planning, 7,* 171–179.

Hull, R. B., & Stewart, W. P. (1992). Validity of photo-based scenic beauty judgments. *Journal of Environmental Psychology, 12,* 101–114.

Jostmann, N., Koole, S. L., Van der Wulp, N., & Fockenberg, D. (in press). Subliminal affect regulation: The moderating role of action versus state orientation. *European Psychologist.*

Kaplan, R., & Kaplan, S. (1989). *The experience of nature: A psychological perspective.* Cambridge, United Kingdom: Cambridge University Press.

Kazén, M., Baumann, N., & Kuhl, J. (2003). Self-infiltration and self-compatibility checking in dealing with unattractive tasks: The moderating role of state vs. action-orientation. *Motivation and Emotion, 27,* 157–197.

Kazén, M., Baumann, N., & Kuhl, J. (2004). *Self-regulation after mortality salience: National pride feelings of action-oriented German participants.* Unpublished data, University of Osnabrück, Osnabrück, Germany.

Koole, S L. (2004a). *Affective priming and affect regulation: The moderating role of action versus state orientation.* Manuscript submitted for publication, Vrije Universiteit Amsterdam.

Koole, S. L. (2004b). Volitional shielding of the self: Effects of action orientation and external demand on implicit self-evaluation. *Social Cognition, 22,* 117–146.

Koole, S. L., & Jostmann, N. (2004). Getting a grip on your feelings: Effects of action orientation and external demands on intuitive affect regulation. *Journal of Personality and Social Psychology, 87,* 974–990.

Koole, S. L., & Kuhl, J. (in press). Dealing with unwanted feelings: The role of affect regulation in volitional action control. In J. Shah & W. Gardner (Eds.), *Handbook of motivation science.* New York: Guilford Press.

Koole, S. L., Kuhl, J., Jostmann, N., & Vohs, K. D. (2005). On the hidden benefits of state orientation: Can people prosper without efficient affect regulation skills? In A. Tesser, J. Wood, & D. A. Stapel (Eds.), *On building, defending, and regulating the self: A psychological perspective* (pp. 217–243). London: Taylor & Francis.

Koole, S. L., Smeets, K., van Knippenberg, A., & Dijksterhuis, A. (1999). The cessation of rumination through self-affirmation. *Journal of Personality and Social Psychology, 77,* 111–125.

Koole, S. L., & Van den Berg, A. E. (2004). Paradise lost and reclaimed: A motivational analysis of human-nature relations. In J. Greenberg, S. L. Koole, & T. Pyszczynski (Eds.), *Handbook of experimental existential psychology* (pp. 86–103). New York: Guilford Press.

Korpela, K., Hartig, T., Kaiser, F. G., & Führer, U. (2001). Restorative experience and self-regulation in favorite places. *Environment and Behavior, 33,* 572–589.

Kuhl, J. (1981). Motivational and functional helplessness: The moderating effect of state versus action orientation. *Journal of Personality and Social Psychology, 40,* 155–170.

Kuhl, J. (1984). Volitional aspects of achievement motivation and learned helplessness: Toward a comprehensive theory of action-control. In B. A. Maher (Ed.), *Progress in experimental personality research* (Vol. 13, pp. 99–171). New York: Academic Press.

Kuhl, J. (1994). Action versus state orientation: Psychometric properties of the Action Control Scale (ACS-90). In J. Kuhl & J. Beckmann (Eds.), *Volition and personality: Action versus state orientation* (pp. 47–59). Göttingen, Germany: Hogrefe & Huber.

Kuhl, J. (2000). A functional-design approach to motivation and self-

regulation: The dynamics of personality systems interactions. In M. Boekaerts, P. R. Pintrich, & M. Zeidner (Eds.), *Handbook of self-regulation* (pp. 111–169). San Diego, CA: Academic Press.

Kuhl, J. (2001). *Motivation und Persönlichkeit: Interaktionen psychischer Systeme* [Motivation and personality: Interactions between psychic systems]. Göttingen, Germany: Hogrefe.

Kuhl, J., & Beckmann, J. (1994a). Alienation: Ignoring one's preferences. In J. Kuhl, & J. Beckmann (Eds.), *Volition and personality: Action versus state orientation* (pp. 375–390). Göttingen, Germany: Hogrefe & Huber.

Kuhl, J., & Beckmann, J. (1994b). *Volition and personality: Action versus state orientation.* Göttingen, Germany: Hogrefe & Huber.

Kuhl, J., & Kazén, M. (1994). Self-discrimination and memory: State orientation and false self-ascription of assigned activities. *Journal of Personality and Social Psychology, 66,* 1103–1115.

Kuhl, J., & Koole, S. L. (2004). Workings of the will: A functional approach. In J. Greenberg, S. L. Koole, & T. Pyszczynski (Eds.), *Handbook of experimental existential psychology* (pp. 411–430). New York: Guilford Press.

Mussweiler, T., & Förster, J. (2000). The sex→aggression link: A perception-behavior dissociation. *Journal of Personality and Social Psychology, 79,* 507–520.

Öhman, A., & Mineka, S. (2000). Fears, phobias, and preparedness: Toward an evolved module of fear and learning. *Psychological Review, 108,* 483–522.

Orians, G. H. (1980). Habitat selection: General theory and applications to human behavior. In J. S. Lockard (Ed.), *The evolution of human social behavior* (pp. 49–66). New York: Elsevier.

Pyszczynski, T., Greenberg, J., & Solomon, S. (1997). Why do we need what we need? A terror management perspective on the roots of human social motivation. *Psychological Inquiry, 8,* 1–20.

Rosnow, R. L., & Rosenthal, R. (1995). "Some things you learn aren't so": Cohen's paradox, Ach's paradigm, and the interpretation of the interaction. *Psychological Science, 6,* 3–9.

Rudzitis, G., & Johansen, H. E. (1991). How important is wilderness? Results from a United States survey. *Environmental Management, 15,* 227–233.

Sedikides, C., & Skowronski, J. J. (1997). The symbolic self in evolutionary context. *Personality and Social Psychology Review, 1,* 80–102.

Shacham, S. (1983). A shortened version of the Profile of Mood States. *Journal of Personality Assessment, 47,* 305–306.

Shultis, J. (1999). The duality of wilderness: Comparing popular and political conceptions of wilderness in New Zealand. *Society & Natural Resources, 12,* 389–404.

Simon, L., Greenberg, J., & Brehm, J. (1995). Trivialization: The forgotten mode of dissonance reduction. *Journal of Personality and Social Psychology, 68,* 247–260.

Solomon, S., Greenberg, J., & Pyszczynski, T. (1991). A terror management theory of social behavior: The psychological functions of self-esteem and cultural worldviews. In M. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 24, pp. 93–159). San Diego, CA: Academic Press.

Solomon, S., Greenberg, J., & Pyszczynski, T. (2004). The cultural animal: Twenty years of terror management theory and research. In J. Greenberg, S. L. Koole, & T. Pyszczynski (Eds.), *Handbook of experimental existential psychology* (pp. 13–34). New York: Guilford Press.

Tahvanainen, L., Tirväinen, L., Ihalainen, M., Vuorela, N., & Kohlemainen, O. (2000). Forest management and public perceptions—Visual versus verbal information. *Landscape and Urban Planning, 53,* 53–70.

Tesser, A. (1988). Toward a self-evaluation model of social behavior. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 21, pp. 181–227). New York: Academic Press.

Thacker, C. (1983). *The wildness pleases: The origins of romanticism.* London: Croom Helm.

Ulrich, S. R. (1993). Biophilia, biophobia and natural landscapes. In S. R. Kellert & E. O. Wilson (Eds.), *The biophilia hypothesis* (pp. 73–137). Washington, DC: Island Press.

Van den Berg, A. E. (1999). *Individual differences in the aesthetic evaluation of natural landscapes.* Unpublished doctoral dissertation, University of Groningen, Groningen, the Netherlands.

Van den Berg, A. E. (2003). Personal need for structure and landscape preference. In L. Hendrickx, L. Steg, & W. Jager (Eds.), *Human decision making and environmental perception: Understanding and assisting human decision making in real-life settings* (pp. 129–148). Groningen, the Netherlands: University of Groningen Press.

Van den Berg, A. E., De Vries, D., & Vlek, C. A. J. (in press). Images of nature, environmental values, and landscape preference: Exploring their relationships. In R. J. G. Van den Born, R. H. J. Lenders, & W. T. De Groot (Eds.), *Visions of nature: A scientific exploration of people's implicit philosophies.* Münster, Germany: LIT-Verlag.

Van den Berg, A. E., Koole, S. L., & Van der Wulp, N. (2003). Environmental preference and restoration: (How) Are they related? *Journal of Environmental Psychology, 23,* 135–146.

Van den Berg, A. E., & Ter Heijne, M. (2004). *Fear versus fascination: An exploration of emotional responses to natural threats.* Manuscript submitted for publication.

Van den Berg, A. E., & Vlek, C. A. J. (1998). The influence of planned-change context on the evaluation of natural landscapes. *Landscape and Urban Planning, 43,* 1–10.

Van den Berg, A. E., Vlek, C. A. J., & Coeterier, J. F. (1998). Group differences in the aesthetic evaluation of nature development plans: A multilevel approach. *Journal of Environmental Psychology, 18,* 141–157.

Wegner, D. M. (1994). Ironic processes of mental control. *Psychological Review, 101,* 34–52.

Wentura, D. (2000). Dissociative and associative priming affects in the lexical decision task: *Yes* versus *no* responses to word targets reveal evaluative judgment tendencies. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 26,* 456–469.

Williams, K., & Harvey, D. (2001). Transcendent experience in forest environments. *Journal of Environmental Psychology, 21,* 249–260.

Wilson, E. O. (1984). *Biophilia.* Cambridge, MA: Harvard University Press.

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